

## ORIGINAL ARTICLE

# The Effect of Aloe vera on Growth and Body measurement traits in cross bred calf

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### ABSTRACT

The experiment was conducted at Instructional Dairy Farm, Nagla, G. B. Pant University of Agriculture and Technology, Pantnagar of district U.S. Nagar, Uttarakhand. The research was conducted on twelve newborn female crossbred calves to assess the effect of Aloe vera supplementation on growth rate and body measurement. The growth trial was conducted for 10 weeks (from February 18, 2012 to April 28, 2012) including first week as acclimatization feeding period. The body weight of crossbred calves without Aloe vera supplemented group ( $T_0$ ) and the treatment groups ( $T_1$  and  $T_2$ ) revealed that the initial mean body weights of calves were almost same ( $27.603 \pm 0.91$ ,  $27.797 \pm 0.55$  and  $27.641 \pm 0.57$  kg) for all the groups, respectively. At the end of experimental period (9 weeks) the average body weight gain in the each corresponding group was 24.559, 28.348 and 30.324 kg respectively. The overall change in body length (cm) was significantly higher ( $P < 0.05$ ) in Aloe vera supplemented groups (11.32 cm in  $T_1$  and 12.32 cm  $T_2$ ) than control group (8.85 cm). The total change in chest girth was higher in Aloe vera supplemented groups (16.10 cm in  $T_1$  and 18.15 cm in  $T_2$ ) than control group (11.05 cm). The analysis of variance revealed that Aloe vera had the significant effect ( $P < 0.05$ ) on chest girth in higher treatment group as compare to control group.

**Keywords:** Aloe-Vera, Crossbreed Calf, Body weight, Growth

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### INTRODUCTION

Aloe vera is an African native plant and has more than 360 species all over the world. Today two species are grown commercially, namely *Aloe barbadensis* Miller, also called Aloe vera, and *Aloe arborescence*. The main ingredient of Aloe is called gel, which covers inner portion of the leaves. It is clear, colourless, and tasteless. Aloe Vera gel, like most natural juices in both fruits and vegetables, is unstable and subject to discoloration and spoilage from contamination by microorganisms. It is, therefore, most important to stabilize and concentrate the gel in powder natural form, for commercial use in nutritional foods and cosmetics. Detailed studies explored Aloe's several other characteristics, including that of antibacterial, anti-inflammatory, and antiseptic properties of Aloe vera. Aloe vera may penetrate injured tissue, relieve pain, dilate capillaries, and work as an anti-inflammatory agent. It has also been shown by Davis *et.al* [1] that certain amino acids, vitamins, RNA act as anti-inflammatory. These and other compounds are grouped together to form the inhibitory systems. Glycoproteins (enzymes) form a part of this system. Immune stimulators, growth-factors and muco-polysaccharides heal wounds and are grouped together to form stimulatory system. Many active components in both systems synergize, so that the final total activity in each system is greater than the sum of the active compounds. Grindlay and Reynolds, [2] revealed that Aloe vera seems to promote healthy-cell growth. Winters, [3] found that fresh Aloe vera leaves contained lectin-like compound, which enhanced the growth of normal human cells. It is pointed out that Aloe vera gel promotes the regeneration of normal tissue [4].

In pre-ruminant phase, the young calves are highly susceptible to enteric bacterial imbalance, leading to inefficient digestion and absorption of nutrients and gastrointestinal infections resulting in poor growth and high mortality and, about 30% mortality is recorded due to gastrointestinal infection. To overcome these implications, diets have been supplemented with various antibiotics. Antibiotics as growth promoters appear to act by reducing the pathogenic bacteria and modifying the microflora in the gut of the animal [5]. Here in the present study an attempt has been made to incorporate different level of Aloe vera crude extract in the feed to see its effect on growth performance in crossbred calves.

## MATERIALS AND METHODS

The experiment was conducted on twelve newborn female crossbred calves at Instructional Dairy Farm, Nagla, G. B. Pant University of Agriculture and Technology, Pantnagar of district U.S. Nagar, Uttarakhand. Pantnagar is situated at longitude of 79.30° E, latitude of 29° N and altitude of 243.84 meters above mean sea level in the *tarari* region of Uttarakhand in Northern India. This work was conducted on twelve newborn female crossbred calves to assess the effect of Aloe vera supplementation on growth rate and body measurement. The growth trial was conducted for 10 weeks (from February 18, 2012 to April 28, 2012) including first week as acclimatization feeding period. The details of materials and techniques used during course of investigation are given below:

### Selection and Distribution of Calves

A total of twelve newborn crossbred (Holstein Friesian × Sahiwal) female calves (5-day-old) weaned after birth and were divided into three groups of four animals in each group on the basis of their body weight as follows: T<sub>0</sub> (Control), T<sub>1</sub> (Aloe vera supplementation @ 2 g per kg body weight), T<sub>2</sub> (Aloe vera supplementation @ 4 g per kg body weight)

### Showing distribution of crossbred calves in different groups

Group	Calf Number	Initial Body Weight (kg)
Control Group (T <sub>0</sub> )	C <sub>1</sub>	28.000
	C <sub>2</sub>	27.200
	C <sub>3</sub>	27.934
	C <sub>4</sub>	27.280
Treatment group-1 (T <sub>1</sub> )	A <sub>1</sub>	29.200
	A <sub>2</sub>	28.180
	A <sub>3</sub>	26.920
	A <sub>4</sub>	26.890
Treatment group-2 (T <sub>2</sub> )	B <sub>1</sub>	28.640
	B <sub>2</sub>	27.970
	B <sub>3</sub>	27.957
	B <sub>4</sub>	25.998

There were two experimental treatments and one control feeding schedule designed for crossbred calves to conduct the research trial which are described as follows:

Control Group (T<sub>0</sub>)- Feeding schedule as per the Table 3.1 was followed. Treatment group-1 (T<sub>1</sub>) -Along with the Feeding schedule of Table 3.1, Aloe vera supplementation @ 2 g per kg body weight in milk was done. Treatment Group-2 (T<sub>2</sub>)- Along with the Feeding schedule of Table 3.1, Aloe vera supplementation @ 4 g per kg body weight in milk was done.

Since data of weight gain were taken weekly, therefore mean of the body weight of treatment groups were considered for calculation of amount Aloe vera. Once amount of Aloe vera for a group was calculated then it was continued to fed till next due date of data collection.

### Growth and Body Measurements

#### Body Weight Gain

Body weight of each calf was recorded at weekly intervals during the experimental period. Weighing was always recorded around 8.00 AM. The weighing of calves was done on digital electronic balance with capacity of weighing up to 100 kg (the minimum graduation being 0.001 kg). The rate of growth was calculated as follows:

$$\text{Body Weight Gain (kg)} = \text{Body weight at the end of experiment (kg)} - \text{Body weight at beginning of experiment (kg)}$$

$$\text{Average Daily Weight Gain (kg)} = \frac{\text{Total Body Weight Gain (kg)}}{\text{Duration Of Growth Trial (days)}}$$

#### Body Measurements

Body measurements were taken by single recorder with utmost precision to the nearest centimeter and on each calf. Measurements were taken when the animal was standing comfortably and evenly on its feet on hard and smooth cemented floor. Re-windable 152 cm long measuring tape with precision 0.2 cm was used for measuring the body length, chest girth and height at withers.

**Showing description of different body measurements**

Sr. No	Particulars	Symbol	Description
1	Body Length (cm)	BL	Oblique distance between point of shoulder and pin bone
2	Height at Withers (cm)	HAW	Vertical distance from ground to highest point of withers
3	Chest Girth (cm)	CG	Circumference of chest just behind point of elbow

**Measurement of skin thickness**

Thickness of skin at the flank region is considered as one of the most representative site as recommended by Manimohan and Prabhu [6], so the skin fold thickness measurement at the flank region was taken while the animals stood squarely on all four feet, head raised in a normal alert position. Measurements were taken with digital calipers by exerting uniform pressure. Skin thickness was then derived from such skin fold thickness measurements as follows:

$$\text{Skin Thickness (mm)} = \frac{\text{Skin Fold Thickness (mm)}}{2}$$

**Statistical Analysis**

The experimental data obtained during the study were analyzed statistically using completely randomized design with the simple analysis of variance technique. Weekly and fortnightly mean with standard error were estimated for respective treatments separately. The difference among the treatment means for each character was further tested [7].

**RESULTS AND DISCUSSIONS****Growth Performance**

The growth of an animal, its organs or tissues is clearly under a coordinated integrated control system [8]. Growth, a complex phenomenon in body weight and other physical phenomenon in body weight and other physical measurements are a product of complex interaction of genetics, nutrition and management [9]. The body weight gain is often used as an evaluating tool to measure the response of animal to the diets, environment and managerial practices. In the present study, the Aloe vera (*Aloe barbadensis*) as feed supplement was evaluated for its effectiveness in improving the feed intake, growth, resistance power to internal parasitic load in crossbred calves.

The data pertaining to gains in live weight gains and body measurements of calves with or without Aloe vera supplementation have been presented below:

**Body Weight**

The average body weights of crossbred calves at weekly intervals from 0 to 9 weeks of experimental feeding have been presented in Table 1. The body weight of crossbred calves without Aloe vera supplemented group (T<sub>0</sub>) and the treatment groups (T<sub>1</sub> and T<sub>2</sub>) (Table 4.1) revealed that the initial mean body weights of calves were almost same (27.603±0.91, 27.797±0.55 and 27.641±0.57 kg) for all the groups, respectively. At the end of experimental period (9 weeks) the average body weight gain in the each corresponding group was 24.559, 28.348 and 30.324 kg respectively.

The Aloe vera supplementation had significant effect (P<0.05) on body weight gain in treatment groups as compare to the control group starting from 6<sup>th</sup> week onwards. While the treatment groups i.e. T<sub>1</sub> and T<sub>2</sub> groups showed significant difference (P<0.05) with each other from 8<sup>th</sup> week to the end of experiment.

The average daily body weight gains (ADG, g/d) were 376, 433 and 480 in control, T<sub>1</sub> and T<sub>2</sub> group respectively. The overall average daily body weight gain was higher in Aloe vera supplemented group as compared to control group. Jagadeeswaran [33] also observed that the broilers fed one percent Aloe vera showed significant increase (P<0.01) in body weight gain at 6 weeks of age as compared to control. Contrary to this Sinurat *et al.* [34] reported that broiler chickens fed with fresh Aloe vera gel (0.25 g/kg) and dry Aloe veragel (0.25 and 1.0 g/kg) had no significant effect on bodyweight.

The reasons for better growth rate might be due to higher DM intake. Antimicrobial property of Aloe vera might also be cause of gain in body weight and growth by inhibiting the growth of pathogenic bacteria in gut. Suleyman and Sema [32] tested antimicrobial efficacy of Aloe vera against some pathogenic strains of bacteria and reported that Aloe vera juice has antimicrobial activity against *M. smegmatis*, *K. pneumoniae*, *E. faecalis*, *M. luteus*, *C. albicans* and *B. sphericus*, but has no inhibitory effect against the other bacterial strains.

Aloe vera also promotes the growth, development and healthiness of intestinal villi [10] which further might be the additional cause of higher growth by facilitating better absorption of digested nutrients. Ghane *et al.* [11] studied the effect of different levels of aloe vera on growth performance, intestinal

microbial population, and serum parameters in Holstein calves and found substantial increase in body weight in treatment groups but noticed no significant difference as compare to control. Demir *et al.* [12] also found similar result weight gain by feeding Garlic in crossbred calves. Similar results were reported like increased feed intake in piglets [13, 14] and body weight gain in piglets [13-15] and lambs [16]. Drenen [17] reported increase in live weight gain accompanied by higher DM intake, when yeast cell was supplemented in grass silage based diet. Supplementation of probiotic (bacteria/yeast) has recently reported to improve nutritional status and to provide therapeutic benefits to ruminant [18]. The use of *Lactobacillus acidophilus* or other lactic acid producing bacteria as dietary adjunct has also created environment to enhance digestion [19]. Reports have shown the effect of yeast culture supplementation on ruminal pH, ammonia, volatile fatty acid, increase rumen fermentation and fibre digestion. Dawson [20] reported that live yeast culture stimulates the activity of cellulolytic microorganisms. Reports also exist to support that YC increase the concentrate of volatile fatty acids in rumen fluid and increases in amino acid flow to the duodenum [21]. In the present study, the beneficial effect was found to be significant. Ghosh *et al.* [22] found 410.43 g body weight gain/calf/day in garlic fed treatment group of pre ruminant crossbred calves as compare to 223.78 g body weight gain/calf/day in control group. Mech and Prasad [23] reported that Sour milk (*dahi*) supplemented calves registered average daily gains (370 g/d) similar to the calves supplemented with probiotics and appreciably better than the control. Malik [24] reported that the average daily gains were 376.53 and 466.21 g. in control and probiotic supplemented pre-ruminant crossbred calves. Similarly, Abe *et al.* [25] reported that, oral administration of *Bifidobacterium pseudolongum* or *Lactobacillus acidophilus* to calves improved body weight gain over the untreated controls. Gombos [26] also observed that Lactosacc (live yeast culture containing lactic acid bacteria) added to the diet at 1 kg per ton significantly increased average daily body weight gain. Yadav *et al.* [27] observed body weight gain in calves treated yeast culture fortified with by-pass protein @ 100 g/calf/day (T). The mean daily body weight gain was not significantly influenced by the treatment in younger calves. However, it was significantly ( $P < 0.05$ ) higher in older calves treatment group ( $712.00 \pm 8.8$  g) as compared to control group ( $553.0 \pm 44.3$  g).

#### **Body Measurements**

The body measurements of crossbred calves were recorded at weekly interval to find out the effect of Aloe vera supplementation on body measurements. The results pertaining to gains in body measurements of calves with or without Aloe vera supplementation have been presented below:

#### **Body Length (BL)**

Data pertaining to the weekly trends in body length and total change in body length have been presented in Table 2. The details of the results indicated that the initial body lengths were  $61.60 \pm 0.79$ ,  $61.6 \pm 0.87$  and  $61.5 \pm 0.42$  cm in control, Aloe vera supplemented groups T<sub>1</sub> and T<sub>2</sub> respectively. These were measured of the order of  $70.45 \pm 0.86$ ,  $72.95 \pm 0.99$  and  $73.95 \pm 0.67$  cm in control group and Aloe vera supplemented groups respectively at the end of experiment. The total change in body length was 8.85 cm for control group and 11.32, 12.32 cm for Aloe vera supplemented groups T<sub>1</sub> and T<sub>2</sub> respectively. Result shows that the total change in body length was higher in Aloe vera supplemented group than in control group.

The results revealed that Aloe vera supplementation had significant effect ( $P < 0.05$ ) on higher treatment group as compare to control from 6<sup>th</sup> week onwards while there was substantial change in body length in lower treatment group as compare to control but they did not differ significantly ( $P > 0.05$ ). As per as the gain in body length in treatment groups concern, higher treatment group (T<sub>2</sub>) showed more gain over lower group (T<sub>1</sub>) but it again not differ significantly ( $P > 0.05$ ). Higher body length in Aloe vera supplemented group than in control group might be attributed to the higher growth. However, Rokde [28] reported non-significant effect of probiotic feeding on groups of crossbred calves. Srivastava [29] also reported no significant effect of probiotic on body length in the groups. However, body length was higher in probiotic supplemented group as compared to control group.

#### **Height at Withers**

The gain in height at withers of crossbred calves at weekly interval from 0 to 9 week of experiment have been presented in Table 3. The average height at withers at initial stage of experiment in control and Aloe vera supplemented group was almost same ( $66.55 \pm 0.37$ ,  $66.50 \pm 2.04$  and  $66.55 \pm 0.57$  cm) while  $77 \pm 0.78$ ,  $78.65 \pm 2.41$  and  $79.75 \pm 1.11$  cm were the final measurements of height at withers in corresponding groups. The gain in height at withers was higher in Aloe vera supplemented group (12.15, 13.20 cm) as compared to control group (10.45 cm), respectively. Trend depicted in figure 3 shows that there was a continuous change height at withers in treatment groups as compare to control although no significant difference were observed between the groups. Rokde [28] and Srivastava [29] reported no significant effect of probiotic on group, period and group x period.

**Chest Girth (CG)**

The chest girth gain (cm) of crossbred calves at weekly interval from 0 to 9 weeks of experiment has been presented in Table 4. At the beginning the average chest girth of crossbred calves in control and treatment groups was similar and values were 67.15±0.63, 66.90±2.04 and 66.90±0.23 cm, respectively. Final measurements of chest girth in corresponding groups at the end of experiment were 78.20±0.93, 82.90±2.70 and 85.05±0.25 cm respectively. The gain in chest girth was higher in Aloe vera supplemented groups (16.10 cm in T<sub>1</sub> and 18.15 cm in T<sub>2</sub>) as compared to control group (11.05 cm).

There was a substantial increase in chest girth in Aloe vera supplemented groups over control from 6th week onwards. Supplementation had significant (P<0.05) effect on chest girth gain in higher treatment group as compare to the control group starting from 6th week onwards. While the treatment groups i.e. T<sub>1</sub> and T<sub>2</sub> did not differ significantly (P>0.05) with each other until the end of experiment. Rokde [28] reported that probiotic had no significant effect on heart girth. However, housing had the significant effect (P<0.05) on Chest Girth. Srivastava [29] reported no significant effect (P>0.05) of probiotic on chest girth in kids.

**Skin Thickness**

The average skin thickness (mm) of crossbred calves at fortnightly intervals from 0 to 9 weeks of experiment has been presented in Table 5. The average gains in skin thickness were 0.614, 0.623 and 0.697 mm in control, treatment group 1 (T<sub>1</sub>) and treatment group 2 (T<sub>2</sub>) respectively during supplementation period.

Although overall gains in skin thickness was higher in Aloe vera-supplemented groups as compared to control group, but there was no significant difference (P>0.05) between each other through out experimental period. Rokde [28] also reported the highly significant effect (P<0.05) on skin thickness of probiotic fed crossbred calves. However, Srivastava [29] reported no significant effect (P>0.05) on skin thickness in kids. Muralidharan [30] studied skin thickness of various crossbred of cattle under different age groups and reported that average skin thickness of the crossbred calves (0-6 months) was 2.60±0.05mm (without giving any treatment), which increases with age. Skin thickness varied from breed to breed, the highest overall average skin thickness being recorded by Friesian x non-descript cross breed namely 2.78±0.04mm. Patel *et al.* [31] found that skin thickness in Kankrej and Jersey had differed significantly, with an increase in thickness of skin with increasing the age of the animals.

**Table 1. Average weekly body weight (kg) of crossbred calves**

Week	Control Group (T <sub>0</sub> )	Treatment Group 1 (T <sub>1</sub> )	Treatment Group 2 (T <sub>2</sub> )
0	27.603±0.21	27.797±0.55	27.641±0.57
I	29.700±0.33	29.897±0.60	29.750±0.31
II	31.961±0.35	32.162±0.63	32.008±0.57
III	34.261±0.42	34.467±0.65	34.337±0.67
IV	36.700±0.84	36.629±0.49	36.830±0.75
V	39.725±1.38	39.775±0.50	40.050±0.48
VI	42.380±1.12	43.528±0.10 <sup>a</sup>	47.545±0.62 <sup>a</sup>
VII	45.006±1.08	47.407±0.40 <sup>a</sup>	48.517±0.95 <sup>a</sup>
VIII	47.880±1.25	51.357±0.35 <sup>a</sup>	53.2475±1.36 <sup>ab</sup>
IX	51.262±1.34	55.047±0.38 <sup>a</sup>	57.865±1.02 <sup>ab</sup>

a = significant difference (p<0.05) as compared to control within same row.

b = significant difference (p<0.05) as compared to treatment group 1 within same row.

**Table 2. Average weekly body length (cm) of crossbred calves**

Week	Control Group (T <sub>0</sub> )	Treatment Group 1 (T <sub>1</sub> )	Treatment Group 2 (T <sub>2</sub> )
0	61.60±0.79	61.6±0.87	61.5±0.42
I	62.90±1.00	62.85±0.89	62.95±0.43
II	64.35±0.85	64.4±0.90	64.4±0.39
III	65.45±0.84	65.65±0.87	65.65±0.42
IV	65.60±0.90	66.9±0.88	66.9±0.55
V	66.40±0.90	68.2±0.92	68.35±0.55
VI	67.10±0.97	69.35±0.96	70.75±0.65 <sup>a</sup>
VII	68.10±0.98	70.6±1.07	71.95±0.72 <sup>a</sup>
VIII	69.15±1.10	71.9±0.94	72.95±0.74 <sup>a</sup>
IX	70.45±0.86	72.95±0.99	73.95±0.67 <sup>a</sup>

a = significant difference (p<0.05) as compared to control within same row.

**Table 3. Average weekly height at withers (cm) of crossbred calves**

Week	Control Group (T <sub>0</sub> )	Treatment Group 1 (T <sub>1</sub> )	Treatment Group 2 (T <sub>2</sub> )
0	66.55±0.37	66.50±2.04	66.55±0.57
I	67.80±0.42	67.85±2.10	67.95±0.60
II	68.95±0.49	69.35±2.23	69.40±0.78
III	70.25±0.61	70.45±2.36	70.60±0.89
IV	71.60±0.63	71.85±2.43	72.00±0.93
V	72.65±0.68	73.00±2.38	73.30±0.97
VI	73.85±0.63	74.30±2.39	74.70±1.06
VII	74.95±0.68	75.80±2.38	76.60±1.15
VIII	75.95±0.68	77.20±2.34	78.30±1.16
IX	77.00±0.78	78.65±2.41	79.75±1.11

**Table 4. Average weekly chest girth (cm) of crossbred calves**

Week	Control Group (T <sub>0</sub> )	Treatment Group 1 (T <sub>1</sub> )	Treatment Group 2 (T <sub>2</sub> )
0	67.15±0.63	66.90±2.04	66.90±0.23
I	68.80±0.70	68.65±2.18	68.55±0.25
II	70.45±0.59	70.50±2.22	70.45±0.25
III	1.85±0.83	72.50±2.30	72.45±0.29
IV	72.55±0.91	74.20±2.37	74.20±0.28
V	73.15±0.87	76.05±2.41	76.15±0.18
VI	73.80±0.81	77.95±2.46	78.95±0.22 <sup>a</sup>
VII	74.85±0.57	79.55±2.53	81.00±0.37 <sup>a</sup>
VIII	76.60±0.74	81.40±2.65	83.10±0.38 <sup>a</sup>
IX	78.20±0.93	82.90±2.70	85.05±0.25 <sup>a</sup>

a = significant difference (p<0.05) as compared to control within same row.

**Table 5 Average fortnightly skin thickness (mm) of crossbred calves**

Fort Night	Control Group (T <sub>0</sub> )	Treatment Group 1 (T <sub>1</sub> )	Treatment Group 2 (T <sub>2</sub> )
0	1.741±0.1975	1.736±0.3749	1.728±0.2004
I	2.201±0.1984	2.217±0.3746	2.202±0.2033
II	2.255±0.1984	2.261±0.3731	2.284±0.2059
III	2.331±0.1998	2.342±0.3728	2.389±0.2059
IV	2.355±0.1972	2.359±0.3749	2.425±0.2009

## SUMMARY

Data generated during the 9 weeks of experimental period was analyzed for various parameters like growth rate, gains in body measurements, feed intake efficiency and internal parasitic load and then it was tabulated for suitable standard statistical procedures. The following observations were recorded during the course of this study:

1. The overall change in body weight was higher in Aloe vera supplemented groups (28.348 kg in T<sub>1</sub> and 30.324 kg in T<sub>2</sub>) than control group (24.559 kg). The body weight gain in calves showed positive and statistically significant difference (P<0.05) in treatment groups as compared to control.
2. The overall average daily body weight gains (ADG, g/d) were 376, 433 and 480 in control, T<sub>1</sub> and T<sub>2</sub> groups, respectively. The gain in daily body weight was significantly higher (P<0.05) in treatment groups as compared to control.
3. The overall change in body length (cm) was significantly higher (P<0.05) in Aloe vera supplemented groups (11.32 cm in T<sub>1</sub> and 12.32 cm T<sub>2</sub>) than control group (8.85 cm).
4. The analysis of variance indicates that Aloe vera had no significant effect (P>0.05) on height at withers in treatment groups as compared to control group. However, the total change in height at withers of calves was substantially higher in Aloe vera supplemented groups than control group.
5. The total change in chest girth was higher in Aloe vera supplemented groups (16.10 cm in T<sub>1</sub> and 18.15 cm in T<sub>2</sub>) than control group (11.05 cm). The analysis of variance revealed that Aloe vera had the significant effect (P<0.05) on chest girth in higher treatment group as compare to control.
6. The average gains in skin thickness were 0.614, 0.623 and 0.697 mm in control, treatment 1 and treatment 2 groups, respectively during supplementation period. The analysis of variance revealed that Aloe vera had the no significant effect on skin thickness in treatment groups as compare to control.

**CONCLUSION**

1. Aloe vera (*Aloe barbadensis*) supplementation (both @ 2 and 4 g per kg body weight) enhanced the body weight in crossbred calves.
2. Aloe vera supplementation (@4 g per kg body weight) promotes the gain in body measurements like body length, chest girth except height at withers in crossbred calves..
3. There was no effect of Aloe vera feeding on skin thickness in treated and control group of calves.

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